

SYNOPSIS

529.^ph. 5
3

OF ALL THE DATA FOR THE

Construction of TRIANGLES,

FROM WHICH

GEOMETRICAL SOLUTIONS

HAVE HITHERTO BEEN IN PRINT.

With References to the Authors, where those SOLUTIONS are to be found:

By JOHN LAWSON, B. D.

Rector of SWANSCOMBE, in KENT.

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A D V E R T I S E M E N T.

IT is but few years ago since the Compiler of this Synopsis conceived his first idea of the usefulness of such an undertaking, and he exhibited a small specimen thereof in a periodical Work then publishing under the Title of THE BRITISH ORACLE. Hereupon he received several letters from Mathematical friends, expressing their sense of the great propriety of such a collection, and strongly encouraging him to pursue the undertaking. Since that time it has been a growing work, and would continue so, were the publication delayed ever so long, as fresh Problems are continually proposed to the public. He has therefore now determined to send it abroad, as complete as he can make it to the present period, and leave additions to be made by future collectors.

A N

E X P L A N A T I O N

O F T H E

- SYMBOLS made use of in this SYNOPSIS.

- H. represents the Hypothenufe of a right-angled triangle.
- V. ——— Vertical angle.
- B. ——— Base or fide oppofite V.
- P. ——— Perpendicular from V on B.
- S&s. ——— Sides about V; S the greater, s the lefs.
- A & a. ——— Angles at B; A the greater, a the lefs.
- m & n. ——— Segments of B by P; m the greater, n the lefs.
- Ar. ——— Area.
- Per. ——— Perimeter.
- L. ——— Line from V to B, bifefting V.
- λ . ——— Line from V to B, cutting B in a given ratio.
- l. ——— Any other line fpecified how drawn.
- R. ——— Radius of infcribed circle.
- ⊙. ——— Circle.
- . ——— Square.
- : ——— Ratio: thus, S : s fignifies the ratio of the fides.

N. B.

N. B. Between each of the Data a full stop is placed. Moreover, m and n are sometimes used for different segments than those of B by P, but then it is signified in words:—the same also is to be observed of P.

Observe likewise, for the more ready finding any proposed Problem in the Synopsis, that the data are ranged in the same order as the Symbols here recited; viz. all data whereof V is one are placed first; next those where B is given, either simply by itself, or combined with any other datum; next P, &c.

Moreover, when in the references you find this mark *, it signifies that such Authors have only constructed the Problem *partially*, and not *generally* as proposed in the Synopsis, e. g. for a right-angled triangle; when it is proposed for a triangle in general; and again, for a line bisecting another, when it is proposed to cut it so that the segments may be in any given ratio.

I N D E X

O F T H E

Authors refered to in the SYNOPSIS.

- A**NDERSONI Var. Prob. Practice, cum Supplemento Apollonii
 Redivivi, 4to. ——— *Parisiis* 1612
 Anderfoni Exercitationum Math. Deas ima. 4to. ——— *ibid.* 1619
 Ashby's Algebra, 2d Edit. 12mo. ——— *Lond.* 1741
 British Oracle (Vol. I. being all that was published) 12mo. ——— *ibid.* 1769
 Castillioneus in Newtoni Arith. Universalem, 4to. ——— *Amstelod.* 1761
 Clavius in Euclidem, var. Ed.
 Court Magazine.
 D'Omerique (Hugonis) Analyfis Geometrica, 4to. ——— *Gadibus* 1699
 Diarian Repository, Periodical Work, printed for Robinson, 4to. *Lond.* 1770, &c.
 Foster's Miscellanies, or Math. Lugubrations, fo. ——— *ibid.* 1659
 General Magazine.
 Gentleman's Magazine.
 Gentleman's Diary.
 Ghetaldi (Marini) Var. Prob. Collectio, 4to. ——— *Venetiis* 1607
 Ghetaldus de Resolutione & Compositione Math. fo. ——— *Romæ* 1640
 Gregorius a Sancto Vincentio, fo. ——— *Antverp.* 1647
 Herigoni Cursus Math. Lat. & Gallicè, 8vo. 5 Tom. ——— *Paris* 1644
 Hutton's Ladies Diaries.
 ——— Mathematical Miscellany.
 Imperial Magazine.
 Ladies Diaries.
 Martin's Math. Correspondence, in his Magazine.
 Mathematical Magazine.
 Mathematician, Periodical Work. 8vo. ——— *Lond.* 1751
 Miscellanea

Miscellanea Curiosæ, Periodical Work.	8vo. 6 Nos.	—	York 1734-5
Miscellanea Cur. Math. Period Work, by Holliday,	4to. 2 vols.	—	Lond. 1745
Miscellanea Scientifica Curiosa, Period. Work,	4to.	—	ibid. 1766
Oughtred's Clavis, var. Editions Lat. & Eng.			
Palladium, Periodical Work.			
Pappus Alexandrinus Commandini,	fo.	—	Bononia 1660
Regiomontanus de Triangulis,	fo.	—	Basilæ 1561
Renaldinus (Carolus) de Res. & Comp. Math.	fo.	—	Patavii 1668
Ronayne's Algebra, 2d Edit.	8vo.	—	Lond. 1727
Rudd's Practical Geometry in 2 Parts,	4to.	—	ibid. 1650
Saunderson's Algebra,	2 vols. 4to.	—	Camb. 1740
Schooten's (Franciscus a) Exercitationes Math.	4to.	—	Lug. Bat. 1657
Simpson's Algebra, 8vo.	—	{ 3d Edit. — 1st Edit. —	Lond. 1767 ibid. 1745
— Select Exercises, 8vo.	—	—	ibid. 1752
— Geometry, 8vo. 2d Edit.	—	—	ibid. 1760
Supplement to Gentleman's Diary, 3 Nos.	12mo.	—	ibid. 1743, &c.
Town and Country Magazine.			
Turner's Mathematical Exercises, Periodical Work,	8vo.	—	ibid. 1750
Universal Magazine.			
Vietæ Opera,	fo.	—	Lug. Bat. 1646
West's Mathematics, 2d Edit.	8vo.	—	Lond. 1763
Wolffius's Algebra, translated by Hanna,	8vo.	—	ibid. 1739

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A POLLONIUS concerning TANGENCIES, as restored by Vieta & Ghetaldus, with a Supplement; the 2d Edit. To which is now added a Second Supplement, being Fermat's Treatise on SPHERICAL TANGENCIES. Likewise Apollonius concerning DETERMINATE SECTION, as restored by Willebrordus Snellius; to which is added an entire new Work, being the same restored by Mr. W. Wales.

SYNOPSIS.

1. V. B. P. **S**IMPSON's Alg. pr. 5. — Mis. Cur. Math. Vol. I. page 31. — Vieta 1st. Ap. to Apollonius Gallus, pr. 5. — *Ashby's Alg. pag. 111. — *Rudd's Pract. Geo. part 2d, qu. 4. — L. Diary, qu. 160.
2. V. B. P : m. Town and Country Mag. Nov. and Dec. 1772.
3. V. B. P+m. Mathematician, pr. 77. — Universal Mag. Mar. 1749.
4. V. B. S : s. Simpson's Alg. pr. 3. — Simp. Geom. pr. 13. — Pappus Lib. VII. pr. 155. — Herigon App. Geometriæ planæ, pr. 13. — D'Omerique Lib. III. pr. 35. — Court Mag. July, 1762.
5. V. B. S+s. Simpson's Alg. pr. 1. — Ghetaldus var. prob. 13 & *7. — Ghetaldus de Res. & Comp. Math. Lib. V. c. 4, pr. 4, pag. 337, & *Lib. II. pr. 9, pag. 93. — Renaldinus pag. 318, 326, 524, 79. — Saunderson's Alg. art. 322. — *Rudd's Prac. Geom. part 2d, qu. 38. — *Ashby's Alg. pag. 102.
6. V. B. S—s. Simpson's Alg. pr. 2. — Ghetaldus var. prob. 12 & *6. — Ghetaldus de Res. & Comp. Lib. V. c. 4, pr. 3, and *Lib. II. pr. 8. — Renaldinus pag. 317, 326, 527, 79. — *Simpson's Sel. Ex. pr. 2. — *Wolfius's Alg. pr. 128. — *Ashby's Alg. pag. 106.
7. V. B. $\overline{S+s} \times S$. *Town and Country Mag. Jan. and Feb. 1769.
8. V. B. S+s+P. Arith. Univ. Castillionei, pr. 5.
9. V. B. Ar. *Simpson's Alg. pr. 33. — Simp. Geom. pr. 5. — *Saunderson's Alg. art. 329. — *D'Omerique L. III. pr. 36. — *Oughtred's
B Clavis

Clavis, ch. 19, pr. 24.—*Vieta Geo. Eff. pr. 20.—*Herigon App. Geo. planæ, pr. 10. — *Rudd's Pract. Geom. part 2d, qu. 47. —*Palladium, 1754, pa. 22.

10. V. B. Per. Reducible to V. B. S+s.
11. V. B. L. Simpson's Alg. pr. 72. — Simp. Geom. pr. 21.
12. V. B. λ . *Simpson's Alg. pr. 58. — *Ghetaldus var. prob. 3. — Regio-
montanus de triangulis, Lib. II. pr. 29.
13. V. B. Direction } Simpson's Sel. Ex. pr. 48.
of l thro' V.
14. V. B. R. *Simpson's Sel. Ex. pr. 29. — Br. Oracle, qu. 67, Cor. —
*West's Mathematics, 2d. Ed. pag. 45.
15. V. B. Side of } Mathematician, pr. 25. — Br. Oracle, qu. 19.
ins. $\square$.
16. V. B : P. S+s. Brit. Oracle, qu. 31.
17. V. B $\pm$ P. S+s. Arith. Un. Castillionei, pr. 7. — *Simpson's Sel. Ex. pr. 31.—
*Simpson's Alg. 1st. Ed. pr. 81.
18. V. B $\pm$ P. Ar. *Turner's Math. Ex. pr. 18.
19. V. B $\pm$ S. s. Ghetaldus var. prob. 16, 17. — *Idem, 10, 11. — Idem de
Res. & Comp. Lib. V. cap. 4, pr. 7, 8. — *Anderson var. prob. 23.
— *Simp. Sel. Ex. pr. 1. — Twylden in Foster's Miscell. pr. 1.
— Renaldinus pag. 526, 529, *437. — *Mathematician, pr.
42. — *Ashby's Alg. pr. 31, 32. — and in other places.
20. V. B $\pm$ S. S+s. Br. Oracle, qu. 102. — *Court Mag. Nov. 1761. — L. Diary,
qu. 661. — *Hutton's L. Diary, qu. 147.
21. V. B $\pm$ S. B+s. *Clavius's Euclid at end of B. II. — *Ghetaldus var. prob. 23.
— *Schooten pr. 37. — *Oughtred ch. 19, pr. 17. — *Saun-
derfon, art. 327. — *Anderson var. prob. 15, 16. — *L. Diary,
1770, p. 35.
22. V. B² : m². P. *Mis. Scient. Cur. qu. 54.

23. V. Point in B.

$$\frac{S+s}{x}$$
} Simpson's Sel. Ex. pr. 43.—Simp. Geom. pr. 19, 20.
24. V. $S+s$ —B. P. Hutton's Miscellany, qu. 5.
25. V. $S+s$ —B. Ar. Math. Mag. No. III. pr. 4.
26. V. $B+S$ —s.
 $S+s+m$ —n. } Gent. Mag. 1768, pag. 428, 519.
27. V. $B \pm S$. Per. *Anderson var. prob. 1, 3. — See V. $B \pm S$. s.
28. V. $B \parallel$ to a given
line. Ar. } Simpson's Sel. Ex. pr. 41. — Simp. Geom. pr. 4.
29. V. Point in B. Ar. Simpson's Sel. Ex. pr. 42.
30. V. $\angle$ of B with λ, λ . *Mathematician, pr. 11. — *York Mis. Cur. qu. 15.
31. V. P. $S : s$. Simp. Alg. pr. 3. — Court Mag. Octo. 1762.
32. V. P. $S \pm s$. Simp. Alg. pr. 80, 78. — *Oughtred ch. 19, pr. 9, 10. —
*Ghetaldus var. prob. 20, 21. — *De Res. & Comp. Lib. III.
pr. 3, 4. — Diarian Repository, pag. 24. — *Hutton's L. Diaries,
qu. 22. — *Wolfius's Alg. pr. 127. — *Ronayne's Alg. B. II. c. 2,
pr. 2.
33. V. P. $S \times s$. D'Omerique Lib. I. pr. 31. — Gent. D. qu. 149.
34. V. P. $m : n$. Simp. Alg. pr. 11.
35. V. P. m —n. Simp. Alg. pr. 10. — Foster's Lug. pr. 2. — *Rudd's Pr.
Geom. part 2d, qu. 5.
36. V. P. Per. Simp. Alg. pr. 60. — Ronayne's Alg. B. II. ch. 1, pr. 2. —
Arith. Univ. Castillionei, pr. 4. — Mis. Cur. Math. qu. 61.
37. V. P. λ . *Town and C. Mag. 1769, pag. 296, 381.
38. V. P. l from A or a
to bis. S or s. } *Br. Oracle, qu. 74.
39. V. P. R. *Br. Oracle, qu. 51.
40. V. P. Ra. of cir-
cum. $\odot$. } Gent. Diary, 1767, qu. 300.
41. V. $P+s$. S —s:
 m —n. } Gent. Diary, 1751, qu. 108.

42. $V. S \text{ or } s. S \times s :$
 $m \times n$, fegts. by L. } Brit. Oracle, qu. 87. — Renaldinus, pa. 337.
43. $V. S \times s. m \times n.$ Brit. Oracle, qu. 60.
44. $V. S : s. m - n.$ Simpson's Alg. pr. 3.
 ↗ When V and $S : s$ are given, the triangle is given in species, and therefore may be constructed with any other datum which does not affect the angles.
45. $V. S : s. R.$ Br. Oracle, qu. 21.
46. $V. S \pm s. m : n.$ Simpson's Alg. pr. 7, 9. — *York Mis. Cur. qu. 46.
47. $V. S \pm s. m - n.$ Simpson's Alg. pr. 6, 8. — *Oughtred ch. 19, pr. 12, 13. — *Ghetaldus var. pr. 8, 9. — Idem, pr. 14, 15. — Renaldinus pag. 319, 529.
48. $V. S \pm s. Ar.$ Anderfon var. prob. 22. — *Simp. Alg. pr. 34.
49. $V. S \pm s. L.$ Deducible from Simpson's Geo. pr. 19, 20.
50. $V. S - s. R.$ *Br. Oracle, qu. 20.
51. $V. S^2 + s^2. \lambda.$ Hutton's Mis. qu. 24.
52. $V. m. n.$ Simpson's Alg. pr. 4. — York Mis. Cur. qu. 17, Cafe 3d. — *Rudd's Pract. Geo. part 2d, qu. 2. — Court Mag. Feb. 1763, m and n being fegts. by L.
53. $V. Ar. Per.$ *D'Omerique L. III. pr. 34. — *Simpson's Alg. pr. 35. — *Simpson's Sel. Ex. pr. 30. — Arith. Uni. Castillionei, pr. 8, *3. — *Rudd's Prac. Geo. part 2d, qu. 7. — L. Diary, 1761, qu. 480. — Mathematician, qu. 49. — Gent. Diary, 1744, qu. 40. — *Wolfius's Alg. pr. 113.
54. $V. Ar. Side \text{ of } ins. \square.$ } L. Diary, 1763, qu. 507. — Court Mag. Dec. 1762.
55. $V. Per. L.$ Reducible to $V. P. Per.$
56. $V. Per. R.$ *Rudd's Prac. Geo. part 1st, qu. 19. — Reducible to $V. B. S + s.$
57. $V. L. m : n,$
 fegts. by L. } Mis. Cur. Math. V. I. qu. 26.
58. $V. L. m - n,$
 fegts. by L. } L. Diary, 1773, qu. 662.

59. V. L. Side of ins. $\square$. } T. and Country Mag. Nov. and Dec. 1772.
60. V. λ . Ra. of circ. $\odot$. } *Gent. Diary, 1766, qu. 282.— Reducible to V. B. λ .
61. B. P. S : s. D'Omerique L. I. 49. — Vieta 1ft. App. Apoll. Galli, pr. 2. — Ghetaldus de Res. & Comp. L. II. pag. 48, 49, &c — Simp. Alg. pr. 23. — Simp. Sel. Ex. pr. 19. — Simp. Geom. pr. 13. — Schooten, pr. 22. — Turner's Math. Exer. prob. 57. — Hutton's Miscel. qu. 58.
62. B. P. S+s. D'Omerique L. III. 25. — Vieta ib. pr. 3. — Gregorius a S. Vinc. pr. 82, pag. 48. — Anderfon var. prob. 20, Cor. — Simp. Alg. pr. 77. — Simp. Geom. pr. 15. — Arith. Un. Castillionei, pr. 9.
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64. B. P. S×s. D'Omerique L. I. 31. — Vieta ib. pr. 1. — Ghetaldus de Res. & Comp. pag. 52. — Simp. Sel. Ex. pr. 21. — Simp. Geom. pr. 16.
65. B. P. A—a. Simp. Alg. pr. 15.
66. B. P. L. Anderfon var. prob. 21.
67. B. P. Supp. of }
A=Comp. of a. } Math. Mag. No. I. pr. 1.
68. B. P : S. S+s. D'Omerique L. III. 30.
69. B. S—P. s—P. Ghetaldus de Res. & Comp. pag. 264.
70. B. $\angle$ of P with S. s. Imperial Mag. Sep. 1760.
71. B. S+s. A or a. Reducible to V. B+S. s.
72. B. S : s. A. Gent. Diary, 1749, qu. 81.
73. B. S : s. A=2a. Hutton's Miscel. qu. 16.
74. B. S : s. A—a. D'Omerique L. I. 50. — Simp. Alg. pr. 14.
75. B. S+s. A—a. Simp. Alg. pr. 12, 13.
76. B. S+s. m : n. D'Omerique L. III. 32. — Renaldinus, pag. 331.
77. B. S—s. Ar. York Mis. Cur. qu. 32. — See B. P. S—s.

78. B.

78. B. $S+s$. Side of ins. $\square$. } Reducible to B. P. $S+s$.
79. B. A. Ar. Gent. Diary, 1741, qu. 5.
80. B. A—a. λ . *Simpf. Algebra, pr. 59.
81. B. A or a. R. Imperial Mag. Nov. 1760.
82. B. R. Ra. of } Mathematician, pr. 66.
circums. $\odot$.
83. B+P. A—a. m—n. L. Diary, qu. 646.
84. B+S. All the } *British Oracle, qu. 50.
angles.
85. B+s. S. n. D'Omerique L. III. 29.
86. B—S. $S+s$. m—n. Oughtred ch. 19, pr. 14. — Ghetaldus var. prob. 5. — Ghetaldus de Res. & Comp. pag. 66.
87. B+S—s. Ar. Per. Gent. Diary, 1749, qu. 89.
88. $\angle$ of B with L. } Town and C. Mag. 1769, pag. 606, 662.
S. s.
89. $\angle$ of B with L. } *Palladium, 1752, qu. 47.
S : s. λ .
90. $\angle$ of B with L. } Ghetaldus var. prob. 4. — Regiomontanus de triang. L. II.
m. n, } 33. — Mis. Scient. Cur. pr. 27.
septs. by L.
91. B $\times$ L a max. S. s. L. Diary, 1773, qu. 656.
92. B $\times$ λ a max. S. s. *L. Diary, 1762, qu. 495.
93. P. P. P. Mis. Cur. Math. Vol. I. pag. 30. — Rudd's Pract. Geom. part 2d, qu. 43.
94. P. S : s. A—a. Simp. Alg. pr. 14.
95. P. $S+s$. A—a. Simp. Alg. pr. 79.
96. P. S : s. m : n. D'Omerique L. III. 33. — Simp. Alg. pr. 25.
97. P. S : s. m—n. Simp. Alg. pr. 24.
98. P. $S+s$. m : n. D'Omerique L. III. 31.

99. P. S+s. m—n. Oughtred ch. 19, pr. 15. — Ghetaldus var. prob. 2. — Ghetaldus de Res. & Comp. pag. 56. — D'Omerique L. III. 27. — Renaldinus, pag. 455, 456.
100. P. S—s. m-n. Oughtred ch. 19, pr. 16. — Ghetaldus var. prob. 1. — Ghetaldus de Res. & Comp. pag. 36. — D'Omerique L. III. 28. — Renaldinus, pag. 460.
101. P. A or a. Per. Reducible to B. S+s. A or a.
102. P. A-a. m:n. Simp. Alg. pr. 17.
103. P. A-a. m-n. Simp. Alg. pr. 19.
104. P. m—n. Ra. of circum. $\odot$. } Martin's Mag. qu. 395.
105. P. L. λ . } *Mathematician, pr. 10. — *L. Diary, qu. 270.
106. P : S. P-n. m-n. Mathematician, pr. 64.
107. P : L. S—s. Ra. of circum. $\odot$. } Gent. Diary, qu. 363.
108. S. s. Ar. Mis. Cur. Math. qu. 121. — Saunderfon, art. 333.
109. S. s. λ . *Mathematician, pr. 9. — *Gent. Diary, 1759, qu. 186. — Simp. Sel. Ex. pr. 33. — Schooten, pr. 23. — *Rudd's Prac. Geometry, part 2d, qu. 14, 16.
110. S. L. n. or s. L. m, fegts. by L. } Br. Oracle, qu. 81.
111. S : s. A. L. Town and C. Mag. Aug. and Sep. 1770.
112. S : s. A-a. m-n. Simp. Alg. pr. 14.
113. S+s. A-a. m:n. Simp. Alg. pr. 17.
114. S+s. A-a. m-n. Simp. Alg. pr. 16, 18.
115. S : s. m. n. Simp. Alg. pr. 22.
116. S+s. m. n. Simp. Alg. pr. 20, 21.

117. S-s. m-n. L. } Gent. Mag. 1768, pag. 471, 570.
 Segts. by L.
118. Sxm. sxn. L. } L. Diary, qu. 622.
 Segts. by L.
119. S-s. m-n. R. Br. Oracle, qu. 61.
120. A or a. R. Side } *Simpf. Sel. Ex. pr. 27.
 of ins. $\square$.
121. A-a. Per. L. Simp. Alg. pr. 61.
122. m. n. L. Simp. Alg. pr. 57.
123. Per. All the } Mathematician, pr. 44.
 angles.

☞ When all the angles are given, the triangle is given in species, and therefore may be constructed, by similar triangles, with any other datum.

Continuation

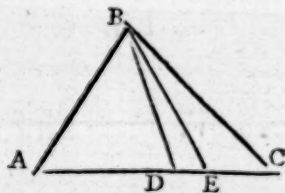
Continuation of the SYNOPSIS,

Containing such Data as cannot readily be expressed by the Symbols before used without more words at length.

124. **I**T is required to construct an isocles triangle such, as to have its equal legs equal to a given line, and moreover supposing a circle inscribed therein, and a diameter thereof drawn parallel to the base, and continued to meet the equal legs, such line shall divide the area in a given ratio.

Rudd's Prac. Geom. part 2d, qu. 46.—Supp. to Gent. Diary, 1741, 1742, qu. 11.

125. In a plane triangle, $A B C$, there is given the angle at C , and the parts or segments of the base $A D$, $A E$; to construct the triangle so, that if $B D$ be drawn, the angle $A B D$ may be a *maximum*, and $B C$ to $E C$ in a given ratio.



L. Diary, 1773, qu. 659.

126. V. B. Line from A or a to divide S or s in a given ratio.

Town and Coun. Mag. Dec. 1772.

127. V. B. Difference of two lines from the angles at the base to the centre of the inscribed $\odot$.

*Simpson's Sel. Ex. pr. 18.

128. V. B. Two lines from A and a meeting in a point O given in position, as also the angle of a line from V to O with either of the sides about the vertical angle.

Mis. Cur. Math. qu. 107.

129. V. A point in B . Rect. of the segments of B made by that point.

Simp. Sel. Ex. pr. 44.

130. Position of a line through V . B. $S-s$.

Simp. Sel. Ex. pr. 49.

131. Position of a line through V . B. S , line bisect. B , & s in geometrical progression.

Simp. Sel. Ex. pr. 51.

132. V. S . The angle of a line from extreme of S with the base, and segment of s cut off thereby adjacent to the base.

* Mis. Cur. Math. Vol. II. qu. 30.

133. V.

133. V. The square of the base equal to the rectangle of one side and a given line.
General Mag. qu. 61.
134. V. P. The angle of two lines from extremes of B to middle of P.
Mathematician, pr. 65.
135. V. B. The angle of two lines from extremes of B to the middle of P.
Brit. Oracle, qu. 91.
136. V. S. The ratio of the square of a line, drawn in a given direction from V to B, to the rectangle of the segments of B made thereby.
Anderfoni Exercitationes Math. No. 8.
137. V. S or s. $m:n$, these being segts. by a line from V to B dividing V into given angles.
Hutton's La. Diary, qu. 139.
138. V. A line from V to B dividing V in a given ratio. Area a *minimum*.
L. Diary, 1761, qu. 479.
139. V. Line from A bisecting S. Line from a bisecting s.
*Simpson's Sel. Ex. pr. 15.
140. V. Per. Line parallel to B bisecting the area.
*Gent. Di. 1750, qu. 98. — Reducible to V. B. S+s.
141. S. s. Line from V to centre of ins. $\odot$.
L. Diary, 1771, qu. 635.
142. Base. One side. Ratio of a line from V, making a given angle with said side, to alternate part of B.
Hutton's Mis. pag. 63, Cor.
143. B. Point of contact therein of ins. $\odot$. $m \times n$.
Hutton's L. Diaries, 1722, qu. 94.
144. L. A perpendicular thereto from one of the angles at the base. The other angle at the base.
L. Diary, 1769, 1770, qu. 604.
145. L. A perpendicular thereto from A. Another from a.
L. Diary 1768, 1769, qu. 588.
146. One of the angles at the base. Perpendicular therefrom to opposite side a *maximum*. A line from the other angle at the base bisecting its opposite side.
*L. Diary, 1769, 1770, qu. 607.
147. S. s. $m:n$, these being segts. by a line from V to B, and the ratio of this line to m or n.
Rudd's Prac. Geom. part 2d, qu. 40.

148. S. s. Line from V making an angle with $S=A$.
Diarian Repository, qu. 197.
149. S. m. n, these being segments of B by l from V making a given angle with S.
T. and Country Mag. 1769, pag 662.
150. One angle at the base. The side adjacent. The ratio of the other side to a line drawn from V to an unknown point in B, and the length of a line drawn from the said point parallel to the given side to terminate in the unknown side.
Hutton's Misc. qu. 23.
151. A—a. R. Line from centre of ins. circle to middle of B.
Gent. Diary, 1771-2, qu. 349.
152. Three lines from the angles bisecting the opposite sides.
Mathematician, pr. 48. —Simp. Sel. Ex. pr. 22.
—Palladium, 1752. qu. 43.
153. Sxs : m×n, segts by L. m—n. Angle made by L & l bisecting the base.
Brit. Oracle, qu. 93.
154. The base of an isocles triangle, and the distance of the vertical angle from the foot of a perpendicular from one of the equal angles upon the opposite side.
Brit. Oracle, qu. 8.
155. P—n. m of an isocles triangle, m and n being segts. by a perpendicular from one of the angles at the base on one of the equal sides.
Court Mag. Sep. 1761.
156. V. Line bisecting A or a. Nearest distance from V to periphery of ins. $\odot$.
*Gent. Diary, qu. 129.
157. V. The segments of S made by a line drawn from A to make a given angle with B.
*Mis. Cur. Math. Vol. I. qu. 79.
158. V. B. Line from A or a to the centre of inscribed circle.
Mis. Sci. Cur. qu. 53.
159. B. L. Line from extremity of L parallel to S or s.
Math. Mag. No. III. prob. 7.
160. V. The segments of B made by a line dividing V into given angles.
Mis. Cur. Math. Vol. II. qu. 48.
161. V. One side. Ratio of the segments of the base made by a line dividing V into given angles.
Palladium, 1756, pa. 43.

S Y N O P S I S

Of Data for Right-angled Triangles which have not yet been constructed in general, the vertical angle being supposed acute or obtuse.

☞ The much greater part of these problems are purposely left without any reference. The Compiler has seen an Author from whom Constructions to them all may be derived, but he forbears to name him, in order to leave them as Exercises for young GEOMETRICIANS.

1. **H.** $H \times P + P^2$.
2. H. $P^2 - n^2$.
3. H. $m^2 - P^2$.
4. H. $S \pm m$, or H. $s \pm n$.
5. H. $S^2 + m^2$, or H. $s^2 + n^2$.
6. H. $S^2 + n^2$.
7. H. $m^2 - n^2$.
8. H. l bisecting A or a.

Univer. Museum, July, 1767. — Ladies Diary, 1772, qu. 633, Cor. — Mis. Scient. Curiosa, pag. 196, Cor. II.

9. $H^2 : S \times s$. Any other datum.
10. $H^2 : S^2 + m^2$, or $H^2 : s^2 + n^2$. any other.
11. $H + P$. $H \times P$.
12. $H + P$. $H \times P + P^2$.
13. $H + P$. $S^2 + n^2$.
14. $H + P$. $m^2 + n^2$.
15. $H \times P + P^2$. P .
16. $H \times P : S^2 + n^2$. any other.
17. $H \times P + P^2 : S^2 + n^2$. any other.
18. $\frac{1}{2}H - P$. $S - s$.

Turner's Math. Ex. pr. 27.

19. $H \pm S$. m , or $H \pm s$. n .
20. $H + S$. n , or $H + s$. m .
21. $H^2 + S^2 : P^2$, or $H^2 + s^2 : P^2$. any other.
22. $H^2 + S^2 : S^2 + m^2$, or $H^2 + s^2 : s^2 + n^2$. any other.
23. $H^2 + S^2$. m , or $H^2 + s^2$. n .
24. $H^2 + S^2$. n , or $H^2 + s^2$. m .
25. $H^2 + S^2 : m^2$, or $H^2 + s^2 : n^2$. any other.
26. $H \times S$. s . or $H \times s$. S .

D'Omerique L. III. pr. 37. — Vieta Geo. Eff. pr. 18. — Oughtred, ch. 19, pr. 25. — Herigon Geo. planæ, pr. 9. — Schooten, pr. 38.

27. $H \times S : s^2$, or $H \times s : S^2$. any other
28. $H + S + m$. $H^2 + S^2 + m^2$.
29. $H + S + m$. $H \times S + S \times m + S^2$.
30. $H + S + m$. $H \times S + S \times m$.
31. $H + S + m$. $H^2 + m^2$.
32. $H^2 + S^2 + m^2 : H \times S + S \times m$. any other.
33. $H^2 + S^2 + m^2 : H \times S + S \times m + S^2$. any other.

34. $H^2 + S^2 + m^2$. $H + m$.
35. $H^2 + S^2 + m^2 : H^2 - m^2$. any other.
36. $H^2 + S^2 + m^2 : H^2 + 2m^2$. any other.
37. $H^2 + S^2 + m^2 : P^2$. any other.
38. $H^2 + S^2 + m^2$. S .
39. $H^2 + S^2 + m^2 : s^2$. any other.
40. $H^2 + S^2 + m^2 : 2S^2 + m^2$. any other.
41. $H^2 + S^2 + m^2 : S^2 + 2m^2$. any other.
42. $H^2 + S^2 + m^2 : S \times n$. any other.
43. $H^2 + S^2 + m^2$. n .
44. $H \times S + S \times m + S^2$. $H + m$.
45. $H \times S + S \times m + S^2$. S .
46. $H + m$. $H^2 - m^2$.
47. $H + m$. P .
48. $H + m$. s .
49. $H^2 + 2m^2 : P^2$. any other.
50. $H^2 \pm m^2 : S^2$. any other.
51. $H^2 - m^2 : S^2 + 2m^2$. any other.
52. $H^2 - m^2$. n .
53. P . $m^2 + n^2$.
54. $P^2 : m^2 \pm n^2$. any other.
55. $P + m$. n , or $P + n$. m .
56. $P - n$. m .
57. $m - P$. n .
58. $P + m$. $m - n$.
59. $P + n$. $m - n$.
60. $P^2 + s^2 : m^2 - P^2$. any other.
61. $P^2 + s^2 : S^2 + n^2$. any other.

62. $P^2 - n^2$. $m^2 - P^2$.
63. $P^2 - n^2 : S^2$. any other.
64. $m^2 - P^2 : s^2$. any other.
65. $m^2 - P^2 : S^2 + n^2$. any other.
66. $P^2 - n^2 : S^2 + n^2$. any other.
67. $P^2 - n^2$. m .
68. $m^2 - P^2$. n .
69. $P^2 - n^2 : m^2$. any other.
70. $m^2 - P^2 : n^2$. any other.
71. $P^2 - n^2$. $m - n$.
72. $m^2 - P^2$. $m - n$.
73. $P^2 - n^2 : m^2 + 2n^2$. any other.
74. $P \times m - P \times n : S^2 + n^2$. any other.
75. S . n , or s . m — Oughtred ch. 19, pr. 11. — Ronayne's Alg. B. II. ch. 2, pr. 1 — Ghetaldus var. prob. 19. — Idem de Res. & Comp. L. III. pr. 2. — Renaldinus, pag. 518.
76. S . $m - n$, or s . $m - n$. Oughtred ch. 19, pr. 8. — D'Omerique, L. III. pr. 24. — Renaldinus, pag. 412. — Ghetaldus var. prob. 18. — Idem de Res. & Comp. L. III. pr. 1. — Foster's Math. Lug. pr. 18.
77. $S^2 : n^2$, or $s^2 : m^2$. any other.
78. $S^2 : s^2 + n^2$, or $s^2 : S^2 + m^2$. any other.
79. $S^2 : 2s^2 + n^2$, or $s^2 : 2S^2 + m^2$. any other.
80. $S + m$. n , or $s + n$. m .
81. $S^2 + m^2$. n , or $s^2 + n^2$. m .
82. $S^2 + n^2$. m , or $S^2 + n^2$. n .
83. $S^2 + n^2 : s^2 + n^2$. any other.

84. $S^2 + n^2$. $m - n$.
85. $S^2 + n^2 : m^2 - n^2$. any other.
86. $S^2 + n^2 : m^2 + 2n^2$. any other.
87. $s^2 + n^2 : m^2 - n^2$. any other.
88. $m - n$. $m^2 - n^2$.
89. Ar. Sides in arithmetical progression. Simp. Alg. pr. 36. — Simp. Sel. Ex. pr. 45.
90. Ar. Sides in geom. progression. Wolfius's Alg. pr. 114. — Simps. Sel. Ex. pr. 46. — Vieta 1st. App. to Apoll. Gallus, pr. 7.
91. Per. Sides in geom. progression. — Simps. Alg. pr. 39.
92. l bisecting an acute angle. l from right angle bisecting the foregoing given line. Gent. Diary, qu. 266.
93. H. Part of S adjacent to the right angle intercepted by a perpendicular to H from middle of H . L. Diary, qu. 633.
94. One leg and a line parallel thereto intercepted by the hypotenuse and the other leg being given; to determine the triangle such, that the rectangle under the hypotenuse and a line from the acute angle, adjacent to the given leg, to the point of intersection of the parallel and the other leg may be of a given magnitude. L. Diary. qu. 648.

N. B. In all the Nos. from 28 to 52 inclusive, S may be changed for s , and m for n , though this be not expressed as in others.

F I N I S.